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AUTHOR	Lazenberry, Dennis; Anderson, Barbara
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ABSTRACT

This report summarizes the deliberations and recommendations of Minnesota's School Bus Safety Advisory Committee (SBSAC). The committee, which operates under the auspices of the Minnesota Department of Public Safety, is charged to study issues affecting the safety of students on school buses, arrive at consensus on ways to improve student safety on buses, and inform and educate the Commissioner of Public Safety, the Governor, and the legislature on the primary issues in school-bus safety. The paper outlines the state's 1999 legislative recommendations for school-bus safety, such as the use of a second stop arm on buses. It then summarizes the actions and discussions of the SBSAC in 1999. Some of these actions included allowing some school buses to be operated by persons with a Class D license, occupant safety, and school-bus safety education. The report describes the enviable safety record of school buses and motorcoaches and discusses a special investigation of school bus and motorcoach crashworthiness issues by analyzing 6 school bus and 40 bus accidents. In its conclusions, the report makes 19 observations about school-bus safety and offers some recommendations to the U.S. Department of Transportation, the National Highway Traffic Safety Administration, and the National Association of Governors' Highway Safety Representatives. (RJM)

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SCHOOL BUS SAFETY ADVISORY COMMITTEE

1999 ANNUAL REPORT

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SCHOOL BUS SAFETY ADVISORY COMMITTEE
1999 ANNUAL REPORT

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MINNESOTA SCHOOL BUS SAFETY ADVISORY COMMITTEE MEMBERS

Major Dennis Lazenberry
Chair
Dept. of Public Safety (State Patrol)
444 Cedar St.
Suite 130
St. Paul, MN 55101-5130
(651) 282-6875
FAX - 651-296-5937
schoolbus@state.mn.us

OPEN APPOINTMENT
Dept. of Human Rights
Commissioner's Designee

Duane Bartels
State Patrol Representative
1110 Centre Point Curve, Suite 410
Mendota Heights, MN 55120
(651) 405-6181
FAX - 651-405-6199
duane.bartels@state.mn.us

Jerry Nesland
School Superintendent Representative
I.S.D. #553, New York Mills
209 Hayes St.
New York Mills, MN 56567
(218) 385-4200
FAX - 218-385-2551
jnesland@nymills.k12.mn.us

OPEN APPOINTMENT
School Bus Driver
Greater Minnesota Area Rep.

Robert W. Fischer
Dept. of Children, Families & Learning
Alternate for Commissioner's Designee
1500 Highway 36 West
Transportation, Room I-20
Roseville, MN 55113-4266
(651) 582-8776
FAX - 651-582-8873
bob.w.fischer@state.mn.us

Nancy Jones Norman
County-City Attorney Representative
14451 Potassium St. N.W.
Ramsey, MN 55303
(612) 323-5626
FAX – 612-422-7524
NJNorman@co.anoka.mn.us

Jon Hovde
School Board Representative
Route 2, Box 16A
Fertile, MN 56540
(218) 945-6781
FAX - 218-945-3513
jdhovde@means.net

Suzanne M. Sylvester
School Bus Driver
Metropolitan Area Representative
1207 Sunnyside Drive
Farmington, MN 55024
(651) 423-7685
FAX – 651-423-7666

Michael J. Krois
School Transportation Contractor
Greater Minnesota Area Rep. (MSBOA)
663 Cherie Lane
Duluth, MN 55803
(218) 724-1707
FAX – 218-724-2432
mkrois@juno.com

OPEN APPOINTMENT
School Transportation Contractor
Metropolitan Area Rep. (MSBOA)

Ken Willms
School Transportation Safety Director
Greater Minnesota Rep. (MAPT)
3200 West Superior Dr.
Duluth, MN 55806
(218) 723-4182
FAX - 218-628-3368
kgwill@duluth.k12.mn.us

Mark Vogel
School Transportation Safety Director
Metropolitan Area Rep.(MAPT)
1111 101st Ave. N.W.
Coon Rapids, MN 55433
(651) 290-8350
FAX - 651-227-9939
mark.vogel@mail.stpaul.k12.mn.us

OPEN APPOINTMENT
Public Member
Parent of Child w/disability that rides bus

OPEN APPOINTMENT
Public Member
Parent of Child that rides bus

Gordon Berg, Jr.
Public Member
No Child rides bus
1655 Stanford Ave.
St. Paul, MN 55105
(651) 698-5631
FAX – N/A
bergg@skypoint.com

Janet Berkseth
Public Member
Parent of Child that rides bus
3820 Bassett Creek Drive
Golden Valley, MN 55422
(612) 521-7906
FAX - N/A
berks002@maroon.tc.umn.edu

Gary Farland
Dept. of Children, Families & Learning
Commissioner's Designee
1500 Highway 36 West
Transportation, Room I-23
Roseville, MN 55113-4266
(651) 582-8772
FAX - 651-582-8873

Jim Connolly
***Ad hoc* Member**
Minnesota Department of Public Safety
Driver & Vehicle Services
445 Minnesota St., Suite 175
St. Paul, MN 55101-5175
(651) 297-3320
FAX – 651-296-5316
jim.connolly@state.mn.us

Gary Hult
Public Member
Parent of Child that rides bus
622 Midwest Trail Place North
Lake Elmo, MN 55042
(651) 736-1415
FAX - 651-733-2481
grhult1@mmm.com

II. FOREWARD

Minnesota Statutes Section 169.435 (1994), State School Bus Safety Administration, provides that the primary responsibility for school transportation safety lies with the Minnesota Department of Public Safety. The School Bus Safety Advisory Committee operates as a mechanism by which the Commissioner of Public Safety can study issues and oversee school bus safety.

The main goals of the committee are to:

1) Study the current issues affecting the safety of students on school buses in Minnesota;

2) Arrive at consensus on recommendations to improve student safety on school buses from the key participants who provide safe school transportation; and

3) Inform and educate the Commissioner of Public Safety, the Governor, and the Legislature on the primary issues in school bus safety and provide recommendations for improvement.

Committee Process

The School Bus Safety Advisory Committee continues to be a consensus decision making group that involves many stakeholders, and uses thorough discussion in developing its recommendations.

The committee considers issues brought forth by groups and organizations concerned with pupil transportation such as: The Minnesota Association for Pupil Transportation (MAPT), the Minnesota School Bus Operators Association (MSBOA) and the School Bus Safety Committee.

III. 1999 LEGISLATIVE RECOMMENDATIONS

1. **Allow second stop arm on school buses.**

   Stop arm violations in Minnesota and nationwide are of great concern. Many states have found that one of the ways to combat this problem is with the installation of a second stop arm on the rear left side of the bus to increase visibility of the sign. Under Minn. Stat. 169.4501 Subd 4, the committee has granted variances to certain contractors and school districts within the state to install a second stop arm toward the rear of the bus. Feedback received from those participating in this variance has been extremely positive. All report a significant increase in driver compliance, and stop arm violations have been dramatically reduced in some areas.

2. **School bus stop signals; When signals are not used.**

   Where circumstances are such that the use of the eight-way stop system could be more dangerous, pupil transportation providers pull off the traveled portion of the roadway to load and unload pupils without using their lights and stop arm. Current statute limits this procedure to separated one-way roadways.

3. **Fund Department of Public Safety for Safety Director & Staff.**

   Background and rationale:

   The Department of Public Safety was given the responsibility for school bus safety in the State of Minnesota during the 1994 legislative session. Although a small amount of funding was provided to support the School Bus Safety Advisory Committee and an incident reporting system, no additional funding was provided for support staff to do this job. The job is vast and the responsibilities are great. This area provides support to school districts and school transportation contractors; law enforcement and licensure review; statute interpretation and trouble shooting problems for the citizens of Minnesota, etc. The number of school bus endorsements and new school bus drivers that must be monitored for licensure and competency each year is a huge responsibility alone. There were 21,888 school bus endorsements on record in 1997 and approximately 450 to 500 new school bus drivers are licensed each year.

The Safety Director should be a person with a minimum ranking of major in the State Patrol. This is important to provide the person with the knowledge and experience to handle the broad scope of responsibility and the rank to be respected. School bus safety is a major priority of the public. The public and the industry need a well-qualified person who can respond to issues in a timely and effective way. Most other states have this level of support for school transportation services.

Improvements in technology for the Department of Public Safety would provide efficiencies for the Department, as well as improved accuracy and cost reductions in reporting. The system is huge and the requirements that must be monitored are growing every year. The Department of Public Safety must have technology support to address the present needs.

V. SUMMARY OF COMMITTEE ACTIONS/DISCUSSIONS IN 1999

Allowing Type A School Buses to be operated by persons with a "Class D" license without requiring cosmetic changes to the vehicle.

Definitions:

(A) A **"Type A" school bus** is a conversion or body constructed upon a van-type or cutaway front section vehicle with a left-side driver's door, with a gross vehicle weight (GVWR) of 10,000 pounds or less, designed for carrying more than ten persons.

(B) A **"Type III" school bus** and Type III Head Start buses are restricted to passenger cars, station wagons, vans, and buses having a maximum manufacturer's rated seating capacity of ten or fewer people, including the driver, and a gross vehicle weight rating of 10,000 pounds or less. In this subdivision, "gross vehicle weight rating" means the value specified by the manufacturer as the loaded weight of a single vehicle. A "type III school bus" and "type III Head Start bus" must not be outwardly equipped and identified as a type A, B, C, or D school bus or type A, B, C, or D Head Start bus. A van or bus converted to a seating capacity of ten or fewer and placed in service on or after August 1, 1999, must have been originally manufactured to comply with the passenger safety standards.

Federal regulations require that the purchase of new vehicles, with 11 passengers or more, used to transport children to and from school be classified as school buses and conform to FMVSS 222 standards. This regulation includes entities such as daycare providers, community organizations like a YMCA, and others.

This regulation has prompted daycare providers, and other entities providing transportation to and from school and school related events, to purchase small, Type A, school buses to transport children under their care.

However, because of state regulations, they are not allowed to operate this vehicle without a CDL unless costly modifications are made to the appearance of the bus. The Type A school bus comes painted National School Bus Yellow and is equipped with a stop arm and eight-way lights. The driver of this bus, equipped as a school bus, must have a CDL. This CDL requirement makes it extremely difficult to find drivers due to a nationwide shortage of CDL licensed school bus drivers.

It is felt by many in the pupil transportation industry that these "Type A" buses can be operated safely with a Class D license.

Under current state law, Head Start providers operate Type A vehicles with a Class D license. However, they are painted a color other than National School Bus Yellow and the stop arm and eight-way lights are deactivated. Because of these cosmetic modifications, these drivers are allowed to operate with a Class D driver's license.

Other pupil transportation providers (some school districts) also use a Type A vehicle, also painted another color, and the stop arm and eight-way lights deactivated. However, unlike Head Start providers, there is a further requirement for the use of this vehicle for school districts. They must also remove seats to comply with the "Type III" school bus definition of 10 passengers or less.

It is felt that the Type A school bus is the same vehicle whether it has 10 or 15 seats, whether it is yellow or purple, and regardless of what outward equipment is installed.

It costs approximately $3,000 to paint one of these buses. Plus the cost involved in removing seats and equipment.

By allowing school districts, and other entities, to operate a Type A vehicle with a Class D license, and not requiring these costly cosmetic changes, more children will be transported in a school bus.

School bus transportation is the safest form of ground transportation in the nation. However, many children are transported every day in vehicles that do not offer the protection of a school bus. There is a growing trend nationwide to discontinue the use of vehicles other than school buses to transport children due to safety and liability concerns. However, because of the school bus driver shortages, many find it difficult or impossible to do so.

As quoted from the School Bus Information Council, "Nationwide, there are fewer than 10 school bus passenger fatalities each year. These tragedies typically involve unavoidable, severe circumstances. Contrast this very minimal risk with the more than 600 school-aged children who are killed each year in passenger cars or other private vehicles during school hours. Most of these deaths could be prevented if children rode in today's ultra safe school buses."

It is felt that current licensing requirements should be reexamined to ease the bus driver shortage in Minnesota and increase the number of children being transported in Type A school buses.

However, it is felt that guidelines must be developed to ensure that these drivers meet certain criteria. These criteria would include training in the safe operation of the vehicle and pupil management, driver's license checks, and possibly drug testing and criminal background checks.

Occupant Safety:

Occupant safety continued to be a topic of discussion throughout this past year. The National Transportation Safety Board (NTSB) investigative report on bus crashworthiness was finally presented in September. It concluded that pupils transported in school buses are using the safest form of transportation in the United States. However, this overall safety picture can be improved. The environment in which our pupils are transported must protect them in three dimensions and in 360 degrees. The NTSB recommended to the National Highway Traffic Safety Administration (NHTSA) that some type of improvements to accomplish this increased safety be developed within two years.

The School Bus Safety Advisory Committee believes this to be a valid recommendation and believes our students are best served by waiting for these developments in the occupant protection area. The Committee also feels that it is not prudent to insert old technology into the school bus occupant area in an effort to increase safety.

See addendum A, the NTSB Abstract of the Bus Crashworthiness report.

School Bus Safety Education:

An investment should be made into an ongoing school bus safety campaign for public education. Monies should be made available to Public Safety's Public Information Office to develop and implement a comprehensive public information program designed to create a safer environment for our children who use the student transportation system. This program would include both the electronic and print media as avenues for a successful public information campaign.

Introduction

School bus and motorcoach travel are two of the safest forms of transportation in the United States. Each year, on average, nine school bus passengers and four motorcoach passengers are fatally injured in bus crashes, according to National Highway Traffic Safety Administration (NHTSA) and motorcoach industry statistics. In comparison, NHTSA statistics show that in 1998 over 41,000 people were fatally injured in highway crashes. Although much has been done to improve the safety of school buses and motorcoaches over the years, the safe transportation of bus passengers, especially students and senior citizens, continues to be a national safety priority. Children and seniors are predicted to be the fastest growing segments of our society, and these groups are the primary users of bus transportation. Therefore, the National Transportation Safety Board initiated this special investigation to determine whether additional measures should be taken to better protect bus occupants.

To address crucial safety questions on bus safety, this special investigation examines school bus and motorcoach crashworthiness issues through the analysis of 6 school bus and 40 bus accidents and through information gathered at the Safety Board's August 12, 1998, public hearing. (See appendix A.) This report also evaluates the Federal Motor Vehicle Safety Standards (FMVSS) that govern the design of school buses and motorcoaches to determine the effectiveness of these standards and to determine whether further occupant protection measures are needed. Also included here are the results of computer simulations performed to evaluate the safety levels afforded by passenger crash protection systems not currently required for school buses. Further, the report reviews international perspectives on, and developments in, motorcoach occupant protection. Finally, the report addresses data collection issues that are hampering effective accident study. During the Safety Board's discussion of bus crashworthiness issues, this special investigation identifies the following safety issues:

- Effectiveness of current school bus occupant protection systems;
- Effectiveness of Federal motorcoach bus crashworthiness standards and occupant protection systems;
- Discrepancies among different Federal bus definitions;
- Deficiencies in the National Highway Traffic Safety Administration's Fatality Analysis Reporting Systems bus ejection data; and
- Lack of school bus injury data.

As a result of this special investigation, the Safety Board makes recommendations to the U.S. Department of Transportation, the National Highway Traffic Safety Administration, the National Association of Governors' Highway Safety Representatives, and the bus manufacturers.

Conclusions

1. In the accidents analyzed for this special investigation, school bus passengers who remained within the seating compartment but not within the intrusion area during the accident sequence were less likely to have been seriously injured than passengers who were out of the compartment before the collision or who were propelled from the compartment during the collision.

2. Because of compartmentalization, school bus passengers are safer now than they were before 1977.

3. Current compartmentalization is incomplete in that it does not protect school bus passengers during lateral impacts with vehicles of large mass and in rollovers, because in such accidents, passengers do not always remain completely within the seating compartment.

4. All potential designs for occupant protection systems to be used on school buses should be tested to uniform performance standards developed by the National Highway Traffic Safety Administration to ensure occupant safety.

5. It cannot be determined whether the current design of available restraint systems for large school buses would have reduced the risk of injury to the school bus passengers in the accidents analyzed for this special investigation.

6. The potential exists for an occupant crash protection system to be developed that would protect school bus passengers in most accident scenarios.

7. One of the primary causes of preventable injury in motorcoach accidents involving a rollover, ejection, or both is occupant motion out of the seat during a collision when no intrusion occurs into the seating area.

8. The overall injury risk to occupants in motorcoach accidents involving rollover and ejection may be reduced significantly by retaining the occupant in the seating compartment throughout the collision.

9. New occupant crash protection systems for motorcoaches should be tested to uniform performance standards developed by the National Highway Traffic Safety Administration that are based upon actual crash testing of motorcoaches to ensure occupant safety.

10. Equipping motorcoach side windows with advanced glazing may decrease the number of ejections of unrestrained passengers during motorcoach accidents and decrease the risk of serious injuries to restrained passengers during motorcoach accidents.

11. Because the increased size of passenger windows in motorcoaches may affect roof strength, rollover strength standards must be developed to take into account the effect of typical window dimensions.

12. The U.S. Department of Transportation does not have standard definitions or classifications for the various bus types.

13. The Fatality Analysis Reporting System (FARS) is not a reliable source for identifying the number of fatal occupant ejections in motorcoaches.

14. The incorporation of bus identification into the vehicle identification number and the expansion of the use category will correct some of the inaccuracies in FARS data, but without standard definitions and accurate classification of buses within FARS, incomplete data and inaccuracies will still exist.

15. The Model Minimum Uniform Crash Criteria do not provide specific enough guidance to the States on bus body type coding.

16. School bus accident injury data are incomplete, and, therefore, injuries cannot be reliably estimated.

17. The use of on-board recorders may help reduce the accident rates of vehicle fleets.

18. On-board recorders are needed to provide quantitative data to evaluate the dynamics of bus crashes.

19. Establishing on-board recording standards for highway vehicles will provide a necessary foundation for the future use of on-board recorders.

Recommendations

To the U.S. Department of Transportation:

In 1 year and in cooperation with the bus manufacturers, complete the development of standard definitions and classifications for each of the different bus body types, and include these definitions and classifications in the Federal Motor Vehicle Safety Standards. (H-99-43)

Once the standard definitions and classifications for each of the different bus types have been established in the Federal Motor Vehicle Safety Standards, in cooperation with the National Association of Governors' Highway Safety Representatives, amend the Model Minimum Uniform Crash Criteria's bus configuration coding to incorporate the FMVSS definitions and standards. (H-99-44)

To the National Highway Traffic Safety Administration:

In 2 years, develop performance standards for school bus occupant protection systems that account for frontal impact collisions, side impact collisions, rear impact collisions, and rollovers. (H-99-45)

Once pertinent standards have been developed for school bus occupant protection systems, require newly manufactured school buses to have an occupant crash protection system that meets the newly developed performance standards and retains passengers, including those in child safety restraint systems, within the seating compartment throughout the accident sequence for all accident scenarios. (H-99-46)

In 2 years, develop performance standards for motorcoach occupant protection systems that account for frontal impact collisions, side impact collisions, rear impact collisions, and rollovers. (H-99-47)

Once pertinent standards have been developed for motorcoach occupant protection systems, require newly manufactured motorcoaches to have an occupant crash protection system that meets the newly developed performance standards and retains passengers, including those in child safety restraint systems, within the seating compartment throughout the accident sequence for all accident scenarios. (H-99-48)

Expand your research on current advanced glazing to include its applicability to motorcoach occupant ejection prevention, and revise window glazing requirements for newly manufactured motorcoaches based on the results of this research. (H-99-49)

In 2 years, develop performance standards for motorcoach roof strength that provide maximum survival space for all seating positions and that take into account current typical motorcoach window dimensions. (H-99-50)

Once performance standards have been developed for motorcoach roof strength, require newly manufactured motorcoaches to meet those standards. (H-99-51)

Modify your methodology to collect accurate, timely, and sufficient data on passenger injuries resulting from school bus accidents so that thorough assessments can be made relating to school bus safety. (H-99-52)

Require that all school buses and motorcoaches manufactured after January 1, 2003, be equipped with on-board recording systems that record vehicle parameters, including, at a minimum, lateral acceleration, longitudinal acceleration, vertical acceleration, heading, vehicle speed, engine speed, driver's seat belt status, braking input, steering input, gear selection, turn signal status (left/right), brake light status (on/off), head/tail light status (on/off), passenger door status (open/closed), emergency door status (open/closed), hazard light status (on/off), brake system status (normal/warning), and flashing red light status (on/off) (school buses only). For those buses so equipped, the following should also be recorded: status of additional seat belts, airbag deployment criteria, airbag deployment time, and airbag deployment energy. The on-board recording system should record data at a sampling rate that is sufficient to define vehicle dynamics and should be capable of preserving data in the event of a vehicle crash or an electrical power loss. In addition, the on-board recording system should be mounted to the bus body, not the chassis, to ensure that the data necessary for defining bus body motion are recorded. (H-99-53)

Develop and implement, in cooperation with other Government agencies and industry, standards for on-board recording of bus crash data that address, at a minimum, parameters to be recorded, data sampling rates, duration of recording, interface configurations, data storage format, incorporation of fleet management tools, fluid immersion survivability, impact shock survivability, crush and penetration survivability, fire survivability, independent power supply, and ability to accommodate future requirements and technological advances. (H-99-54)

To the National Association of Governors' Highway Safety Representatives:

In conjunction with the U.S. Department of Transportation, amend the Model Minimum Uniform Crash Criteria's bus configuration coding to comply with standard definitions and classifications of buses. (H-99-55)

To the bus manufacturers:

Cooperate with the U.S. Department of Transportation in the development of standard definitions and classifications for each of the different bus body types. (H-99-56)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

JAMES E. HALL
Chairman

ROBERT T. FRANCIS II
Vice Chairman

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Member

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Member

Adopted: September 21, 1999